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G4H
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(54) **Systems for playing games**

(57) A system for playing a game comprises a control unit 3 connected to a plurality of play stations 5 by a bus 18. The play stations 5 are uncommitted programmable apparatuses, such as microprocessors having random access program memory, and a game program is supplied to the stations 5 by the control unit 3 prior to commencement of a game. Thus, the system can be set for any game, or can be arranged to play a different game, merely by supplying the appropriate program from the control unit and storing it in the program RAM in the play stations.
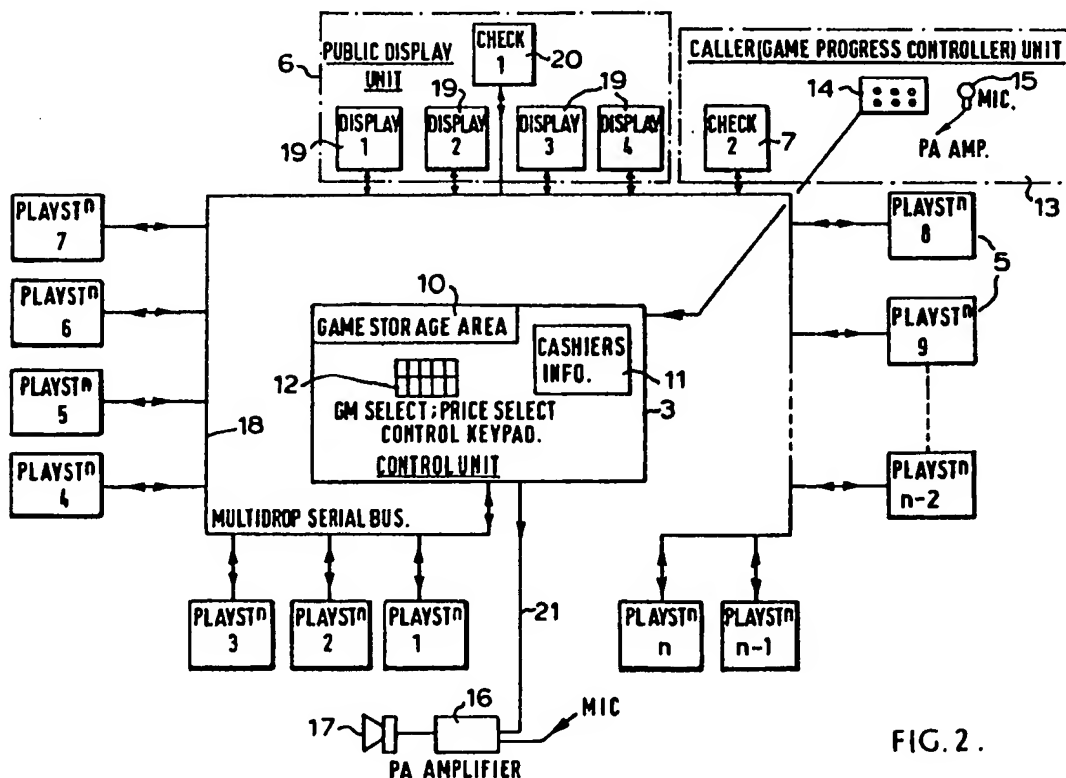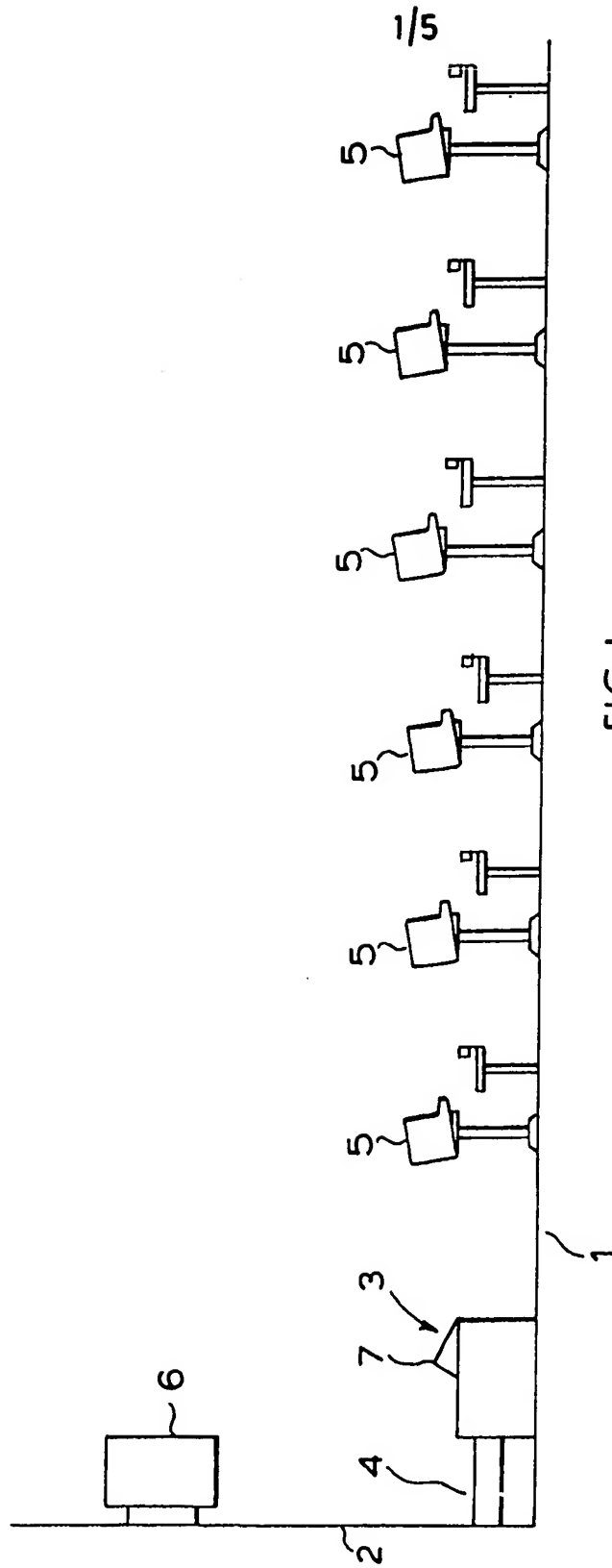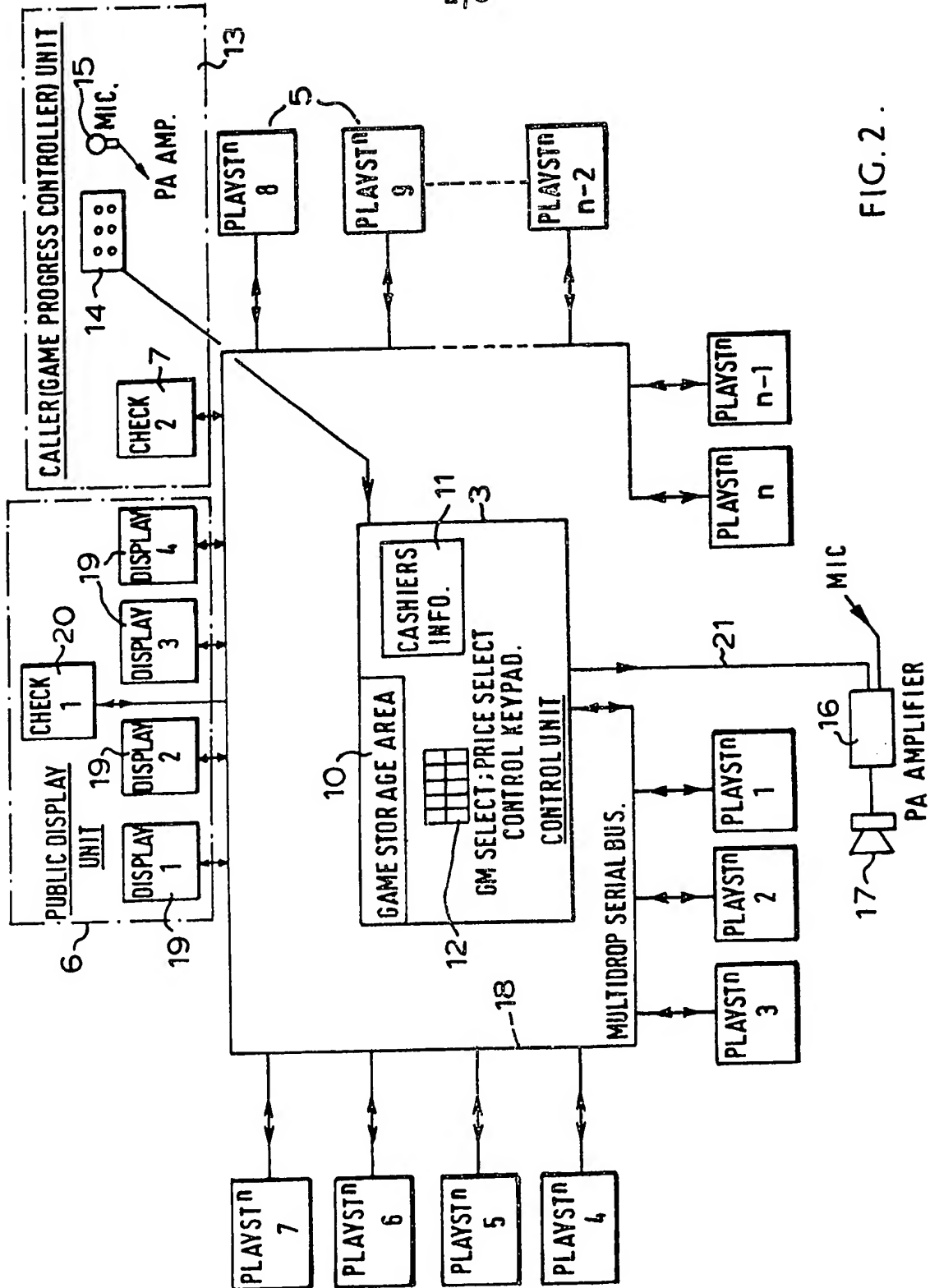
FIG. 2.

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FIG.I.

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FIG. 2.

FIG.3.

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FIG. 4.

L E N

MAINS

14 INCH RGB MONITOR   37

(BLANK DISPLAY)
(FLYBACK SENSING)

PSU
COIN MECHANISM

+5V   +24V   POR

42

S
R
G
B

RES
DISEN

VIDEO SECTION

36

DISPLAY RAM   38

CK 1.25 MHz

44

CK 625 KHz

43

ROM

ADDRESS SWITCHES   35

34

CPU

31

INTERFACE   30

18

GND

+

RAM

33

INTERFACE   39

WAKE UP CCT

+24V

32

LIGHT   41

CONTROLS   40

2151054

PLAYER
12

| 5 | 3 | 7 | 1 |

1	4	2	8
5	3	7	1
2	6	9	0
7	2	1	3

PRICE 00P.
STAKE 00P.
CREDIT 00P.

INSERT
00P.

SWOP
NOW?

SWOP   CALL

5   53   54   55

56   50   51   52   57
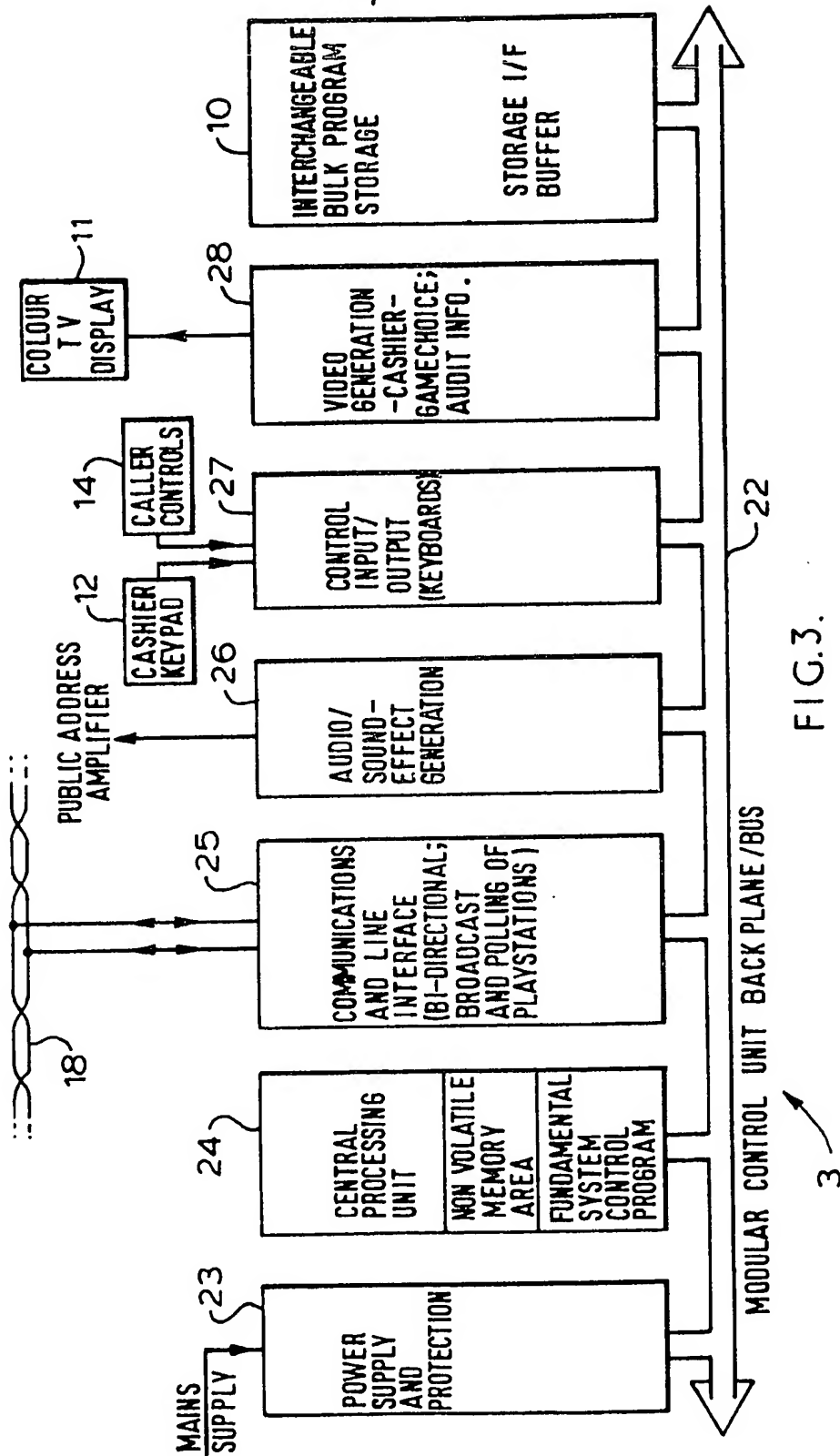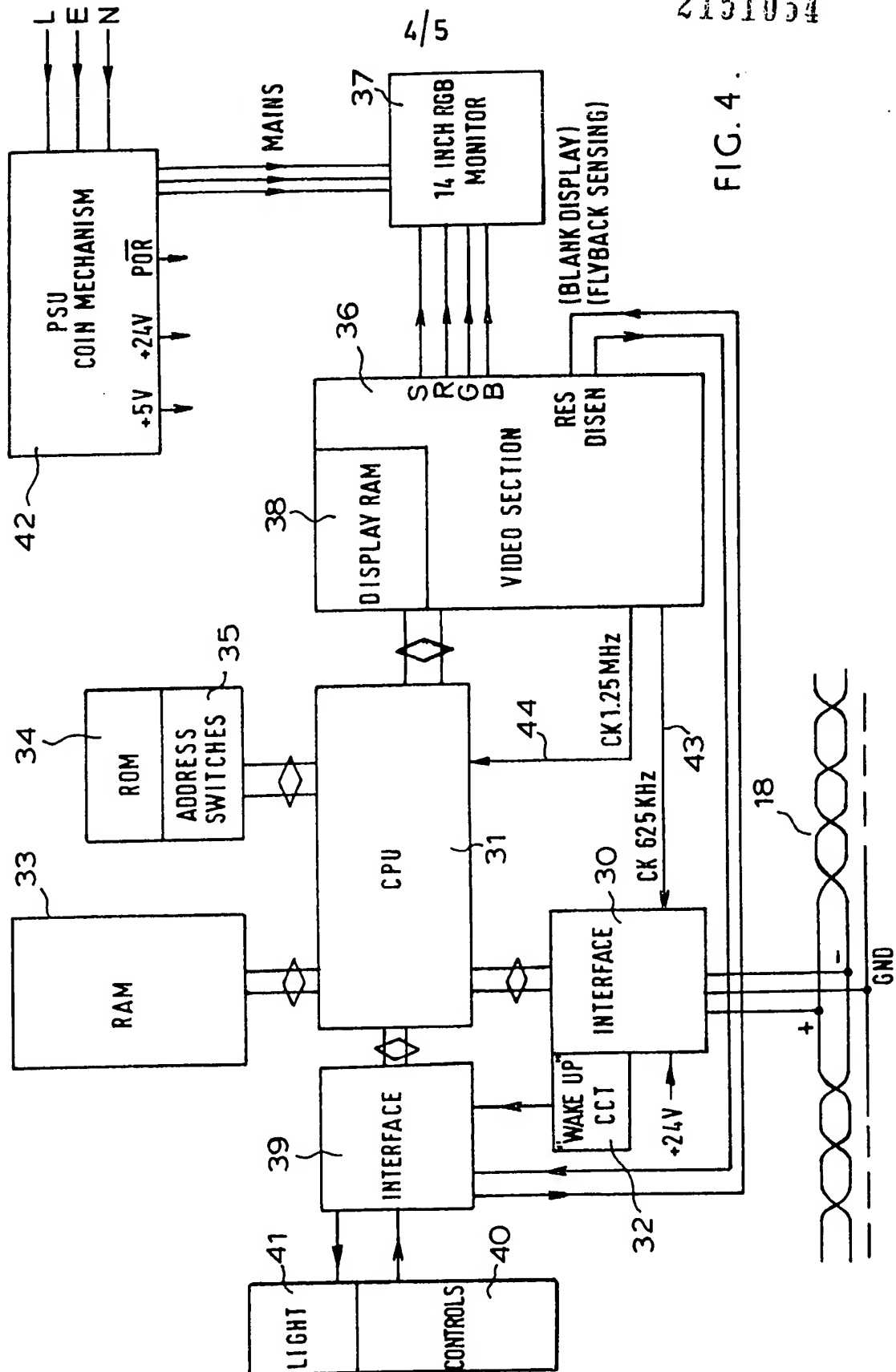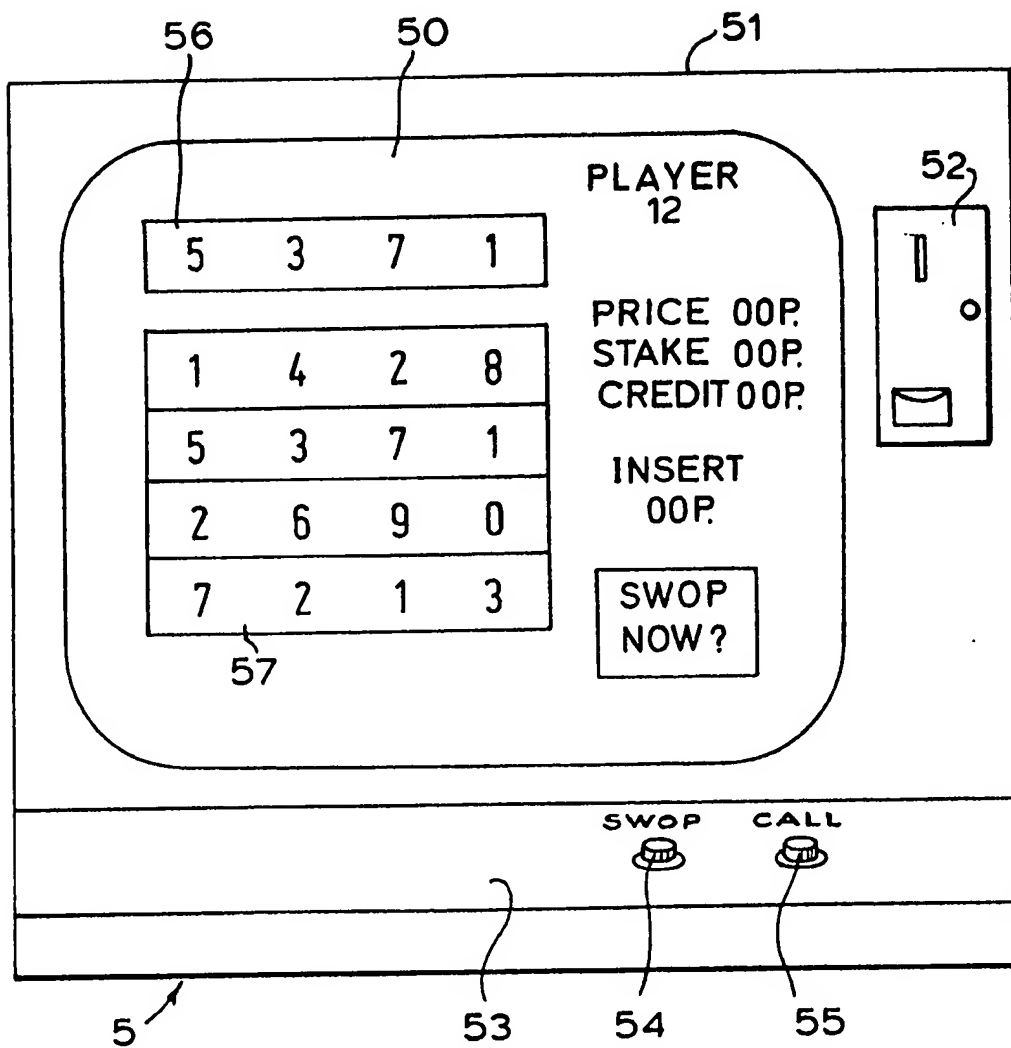
FIG. 5.

SPECIFICATION

Improvements in or relating to systems for playing games

The present invention relates to systems for playing games. The invention is particularly applicable, but not limited, to group participation games in which each individual player has the ability to affect the outcome of a game in which several players participate.

According to one aspect of the invention, there is provided a system for playing a game, comprising a central apparatus and a plurality of remote uncommitted programmable apparatuses, each of the remote apparatuses being arranged to receive at least part of a game program from the central apparatus.

It is thus possible to provide a system which offers a very high degree of flexibility in that various games may be run on the system with at least some of the processing being performed by the remote apparatuses and games may be changed in response to commands at the central apparatus. Although the system may be used to allow a different game to be played at each remote apparatus or to allow a common non-participation game to be played at all of the remote apparatuses, the system is particularly useful for allowing all of the remote apparatuses to participate in a group participation game or for allowing the remote apparatuses to be divided into several groups playing different group participation games. In such games, it is most convenient and efficient for at least some of the information processing to be performed locally at each remote apparatus. However, if dedicated or committed processing were provided in the remote apparatuses, then the whole system would have to be modified in order to permit a change of game and this would be most inconvenient, time-consuming, and expensive. The present invention overcomes this problem and allows remote uncommitted apparatuses to be programmed from a central apparatus, thus allowing a change of game and hence of programming to be performed easily and quickly. When such a system is installed in an amusement area, for instance of the type associated with the well-known "BINGO" game, the game being played can be changed at will so as to maintain the interest of the players.

Each remote apparatus may include coin or token release means arranged to permit operation of the remote apparatus for participation in the game. The central appparatus may be arranged to receive information from the remote apparatuses concerning receipt of coins or tokens and to maintain a record of total payments and, where appropriate, pay-outs.

Each remote apparatus may include a visual display unit, for instance of the raster scan CRT type, for displaying game relates information, and may include at least one player-operable control permitting participation by the player in the game. Each visual display unit may be arranged to display a combination of information common to all of the remote apparatuses and information unique to or distinctive of the respective remote apparatus. The common information may, for instance be the format of the display, instructions for playing the game and operating the apparatus, and information relating to the result of a game being played. The unique or distinctive information may be one or more combinations or permutations of symbols, for instance generated randomly or pseudo-randomly, and the player-operated control may be arranged to change this information if the player wishes to select different combinations or permutations. The game result information may comprise a combination or permutation of symbols whereby matching with the or one of the combinations or permutations at the remote apparatus signifies a win. Although comparison of the game result information with the combinations or permutations may be performed automatically in each remote apparatus or in the central apparatus, it is preferred that the player performs this comparison and is provided with a player-operable control for actuating in order to claim a win. The central apparatus.may be arranged to receive signals from these controls and to perform such a comparison in response thereto in order to check a claimed win. When numerical digits are used as the symbols, the game is similar to the well-known "BINGO" game.

The visual display unit may include a random access memory (RAM) arranged to store character and colour set information, received from the central apparatus as part of the game program. The RAM thus acts, in combination with appropriate timing circuitry, as a programmable character generator and allows the selection of characters and colours appropriate to a particular game.

Each remote apparatus may include a microprocessor arrangement including a RAM for storing the game program received from the central apparatus. Although the microprocessor arrangement may include a read only memory (ROM) which contains an "operating system" program, the RAM is effectively the program memory of the microprocessor arrangement and essentially defines the game steps performed in the remote apparatus.

The system may include at least one uncommitted programmable monitor for displaying game progress information. For instance, the monitor or monitors may display the game result information at or adjacent the location of the central apparatus. The or each monitor may be arranged to receive at least part of a monitor program from the central apparatus. The remote apparatuses, the central appara-

tus, and the monitors may be connected to a common bus, preferably of the serial data type comprising two balanced conductors. The or each monitor may be similar or be
5 identical to the remote apparatuses so that its operation is distinguished from that of the remote apparatuses essentially by means of the program received from the central apparatus. Each remote apparatus and monitor will
10 generally have a unique address allowing the central apparatus to exchange data with all remote apparatuses and monitors simultaneously, with selected groups thereof simultaneously, or with individual remote apparatuses
15 or monitors. For instance, the game and monitor programs may be supplied to all of the remote apparatuses and monitors with different vectored interrupts being used to distinguish the monitors from the remote appara-
20 tuses.

According to another aspect of the invention, there is provided a system for playing a game, comprising a plurality of visual display apparatuses, each arranged to display at least
25 one combination or permutation of symbols characteristic of the respective visual display apparatus and to display a winning combination or permutation of symbols common to all of the visual display apparatuses.

30 The invention will be further described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side view of a system, constituting a preferred embodiment of the inven-
35 tion, disposed in an amusement area;

Figure 2 is a block schematic diagram of the system of Figure 1;

Figure 3 is a block diagram of a central apparatus or control unit of the system of
40 Figure 1;

Figure 4 is a block diagram of a remote apparatus or player station of the system of Figure 1; and

Figure 5 is a front view of the player station
45 of Figure 4.

The system for playing a game shown in Figure 1 is installed in an amusement area having a floor 1 and a wall 2. The system comprises a control unit 3 disposed adjacent a
50 raised platform 4 and connected to a plurality of player stations 5. Each player station comprises a case housing a visual display and associated electronics and a chair for a player. A public display unit 6 is disposed above the
55 platform 4 and includes four display units arranged in a lower row and a check unit flanked by a pair of public address loud speakers in an upper row. A second check unit 7 is disposed in the control unit 3.
60 As shown in Figure 2 of the drawings, the control unit includes a game storage area 10 in which the programmes or software for a plurality of different games for use in the system are stored, for instance in high density
65 read only memory (ROM), floppy disc, or the

like. A visual display unit 11 is arranged to provide cashier information, such as non-resettable accumulators for stake, pay-out, and the like. The control unit has a control key
70 pad 12 to permit selection of the game to be played, selection of the price per play, and the like. If desired, the control unit may be located remotely from the platform 4 so that the unit 3 shown in Figure 1 would be replaced
75 by a caller or game progress controller unit 13 as shown in Figure 2. This unit includes the check unit 7 and further comprises a hand-held control unit 14 for controlling progress of the game and a public address micro-
80 phone 15 connected to a public address amplifier 16 whose output is connected to the speakers 17 forming part of the unit 6.

The control unit 3 is connected to the player stations 5 (labelled 1 to n in Figure 2)
85 by a multidrop serial bus 18, which is also connected to the display units 19 and the check unit 20 forming part of the public display unit 6 and to the check unit 7 for the caller. The play stations, the display units, and
90 the check stations utilize identical hardware and are distinguished from each other by "identity" switch settings within each unit. The control unit is also connected to the public address amplifier by a line 21 in order
95 to supply sound effects during operation of the system.

The control unit 3 shown in Figure 3 comprises a modular back plane/bus 22 to which the various parts of the control unit are con-
100 nected. The control unit further comprises a power supply and protection circuit 23 which receives mains power and supplies power to the whole of the control unit. A central processing unit 24 includes a non-volatile mem-
105 ory area which contains the fundamental system control program for the unit. A communications and line interface unit 25 is connected to the multidrop serial bus 18 and controls bidirectional broadcasting and polling of play
110 stations. The control unit is provided with an audio/sound-effect generator 26 whose output signals are supplied to the public address amplifier 16. An interface 27 is provided for input/output control of the cashier key pad
115 12 and the caller control unit 14. The display unit 11 comprises a colour TV display and is provided with a video generator so as to display cashier information, such as game choice and audit information. The game sto-
120 rage area 10 comprises an interchangeable bulk program store and a buffer store for storing the currently selected game program.

The bi-directional bus 18 comprises a twisted pair for data transmission; and prefer-
125 ably also a ground connection as shown in Figure 4. The twisted pair of conductors are operated as a balanced line so as to give a high degree of noise immunity to the system and so as to reduce substantially the radiation
130 of signals from the bus. Although the follow-

ing description of Figure 4 refers to a play station 5, the display units and check units shown in Figure 2 also have the same construction.

5   The bus 18 is connected to a bi-directional interface 30 which controls transfer of data between the bus 18 and a central processing unit (CPU) 31. The interface 30 converts between the balanced signals, for instance

10   having an amplitude of 24 volts, on the bus 18 and the logic level signals of the CPU 31, and also converts between serial data flow for the bus 18 and parallel data flow for the CPU 31. The interface 30 also includes a "wake-

15   up" circuit 32. The CPU 31 is connected to a program memory 33 which comprises a random access memory (RAM) for storing a game program supplied by the control unit 3. The CPU 31 is also connected to a read only

20   memory (ROM) 34, which effectively stores resident operating system software for the play station, and address switches 35 which assign a unique address to the play station (or display unit or check unit) used by the control

25   unit to poll the station.

The CPU 31 is connected to a video section 36 which provides sync and RGB video signals to a fourteen inch RGB monitor television 37. The video section 36 includes a RAM

30   which provides a memory map for the screen of the monitor 37, and a portion of the RAM, designated display RAM 38, which contains the character and colour set for the display on the monitor 37.

35   The CPU is provided with a further interface 39 which receives signals from the "wake-up" circuit 32, from the video section 36, and from player-operated controls 40. The interface also supplies signals to the video

40   section 36 and to a light 41 located on top of the play station and illuminated to indicate that the station is in use by a player.

The play station is provided with a power supply 42 which includes a coin or token

45   release mechanism. The power supply 42 supplies a + 5 volt supply line for the digital integrated circuits, a + 24 volt power supply line for the interface 30, and a "power on reset" line for initializing the CPU when

50   power is applied to the play station. The power supply receives power from the mains (L, N, E) and also supplies mains power to the monitor 37.

Clock signals for the play station are gener-

55   ated in the video section 36 and are supplied to the interface 30 and the CPU 31 via lines 43 and 44.

Figure 5 shows a front view of a play station 5 and also illustrates the form of

60   display which will be present on the screen 50 of the monitor 37 during an actual game, which will be described hereinafter. The monitor 37 and other circuitry shown in Figure 4 is housed within a casing 51 with the screen 50

65   and the coin release mechanism 52 occupying

the major front surface thereof. An inclined panel 53 supports the switches 40, which comprise a 'swop' switch 54 and a "call" switch 55.

70   In order to play the game which will be described hereinafter, the display provided by all of the play stations 5 has the format shown in Figure 5, this format comprising information which is thus common to all of

75   these play stations. In particular, the top right corner of the screen 50 gives the player address, in this case "12" with the address being unique to the particular play station. Below this is information concerning the price

80   of each game, the stake paid, and any credits obtained. Below this is a prompt which calls for the insertion of a stake, and below this is a prompt concerning swopping of game symbols as will be described hereinafter.

85   The remainder of the screen is taken up by a first box 56, which contains a four digit number displayed on all the play station screens and constituting a winning combination or permutation, and a lower box 57

90   containing a set of four digit numbers, each comprising a row with the digits arranged in columns below corresponding digits of the number in the box 56. The actual numbers in the box 57 are unique to each play station.

95   Accordingly, the display on the screen represents a combination of information which is common to all replay stations and information which is characteristic of and unique to the respective play station.

100 Operation of the system will now be described with particular reference to a particular game, bearing some resemblance to "BINGO", which may be played on the system.

105 When power is initially applied to the system, each of the various units is reset or initialized in a manner well-known in the field of data processing apparatuses. The play stations 5, the display units 19, and the check

110 units 7 and 20 perform an initialization routine which enters the address of each unit as set in the switches 35 and prepares the unit to receive data from the bus 18. Meanwhile, the control unit 3 clears the screen 11 and

115 waits for a "start" command. This is provided by operating the key pad 12 to select a game from the storage area 10 to be played on the system. The relevant program is then stored in the buffer within the storage area 10 and is

120 supplied under control of the CPU 24 via the interface 25 to the bus 18. In particular, a first part of the program from the buffer is sent via the bus 18 to the check units 7 and 20, which are identified by addresses selected

125 on the switches 35 within the respective units, and this part of the program is stored in the RAM 33 in each of these units. The control unit then sends a command code to initialize the check units 7 and 20.

130 Next, the next part of the program for

controlling the display units 19 is supplied to the bus by the control unit 3 and this is stored in the display units 19, which are then initialized by a command from the control

5 unit. The final part of the initializing operation comprises the sending of the remainder of the program for the play stations 5 to the bus 18 followed by a command code to initialize the play stations. At this stage, the screens of the

10 check units 7 and 20 have been "formatted" but no information is displayed as the game has not yet commenced. The display units 19 and the play stations 5 are set to an "attract" mode in which an "attract" display is pro-

15 vided on all of the screens of these units so as to attract players to the system. The play stations 5 are thus ready to receive stake coins via the coin release mechanism 52.

The play stations 5 are then polled in turn

20 by the control unit for exchange of data between the control unit and the play stations.

When a sufficient value of coins or tokens has been inserted into the coin release mechanism 52 of a play station, so that the play

25 station is freed for playing the game (also indicated by illumination of the light 41 at the play station), the words "swop now?" at the bottom right of the screen 50 appear and four four digit numbers generated by the control

30 unit and supplied to the play station are inserted in the box 57 on the screen 50. Each of these four digit numbers is such that no digit is repeated, and is unique to the play station (so as to prevent the possibility of

35 more than one winner of each game). If the player is dissatisfied with these numbers, he can select a further set of such numbers by operating the play switch 54, in which case a further set of four digit numbers is supplied to

40 the play station and displayed on the screen 50.

The number of released play stations is indicated to the caller by means of the check unit 7 in the caller unit 13 and, when the

45 caller judges that a sufficient number of players have joined the game, he actuates a key on the key pad 14 to cause the game to proceed to the next operation. At this stage, no further play stations 5 may join that parti-

50 cular game, although coins or tokens may be inserted so as to prepare a non-operative play station for the next game.

The CPU 24 in the control unit 3 then generates a random or pseudo-random four

55 digit number and supplies this to all of the play stations 5 active during that game. This number is displayed in the box 56 on all of the screens and is compared with the four numbers in the box 57 on the screen 50 of

60 each active play station. Each digit in the box 57 which is equal to the digit in the box 56 and in the same column is then identified by the play station, for instance by changing the background colour of the digit in the box 57,

65 so as to indicate correspondence. A win is scored when one of the four digit numbers in the box 57 of one of the play stations corresponds exactly to the four digit number in the box 56 and common to all play stations. This

70 may be signalled automatically to the control unit 3, but it is preferred that the player checks for a winning combination and operates the call switch 55 so as to signal a claimed win to the control unit. However, if

75 no winning combination is found for the four digit number generated by the control unit, then a further four digit number is generated and supplied to the play stations and the procedure is continued until a winning combi-

80 nation is found. In general, such a winning combination will normally be found within four such "plays".

During this mode of operation, the display units 19 are arranged to display the respec-

85 tive digits of the number supplied by the control unit. When a winning combination is claimed by operation of one of the call switches 55, the display on the display units 19 flashes, as does the display of the number in

90 the box 56 on all of the screens of the play stations to signify a claimed win. The check units 20 and 7 provide a display identical with that of the play station from which a win has been claimed, and the claim is assessed

95 by the caller at the caller unit 13. If the win is not confirmed, then the caller operates the key pad 14 so as to provide another "play". Alternatively, if the claimed win is confirmed by the caller, then he operates the key pad 14

100 so as to confirm the win and the various screens are returned to the attract mode until the next game is started.

The control unit performs various "housekeeping" functions and, in particular, supplies

105 information to a cashier on the screen 11, such as the total "take" number of players, total "credits" from wins, and the like. Some of this information is provided in non-resettable memory within the control unit, in accor-

110 dance with the requirements of the gaming laws.

It should be noted that the game described hereinbefore could also be played on a dedicated system in which the program memories

115 33 in the various units are replaced by read only memories and the storage area 10 is unnecessary. In this case, the system would be reset merely by initializing all of the various processors upon applying power to the

120 system.

With the system shown in the drawings, the game may be changed merely by returning to the initializing steps where the game program is supplied to the various units connected to

125 the bus 18. This may be achieved by actuation of one of the keys of the key pad 12 so as to select another program from the storage area 10 and overwriting this in the memories 33 in the various units, possibly after first

130 erasing these memories. Such operation is

controlled by the CPU 24 of the control unit
and a change of game can be performed
virtually instantaneously. Also, new games for
running on the system can be added merely
5 by entering the relevant new programs in the
storage area 10 followed by "down loading"
as described hereinbefore to the various units
of the system.

10 CLAIMS
    1. A system for playing a game, comprising
a central apparatus and a plurality of remote
uncommitted programmable apparatuses,
each of the remote apparatuses being ar-
15 ranged to receive at least part of a game
program from the central apparatus.